DNA probes fixed to said luminous areas and target polynucleotides (21), carrying out an extending reaction using a base (24) labeled with electrochemiluminescence (ECL) to extend said hybridized DNA probes, and thereby detecting ECL resulting from the application of said voltage; and the presence or absence of any extended chain (26) generated by said extending reaction is detected.--

--21. A polynucleotide assay apparatus characterized in that it has a polynucleotide detecting cell provided with a first plate (11) whereon a first electrode (111) to which different DNA probes (13, 14, 15, 16) are fixed in a plurality of luminous areas (3, 4, 5, 6) differing with the type of DNA probe is formed and a second substrate which is arranged opposite to said first electrode and whereon a plurality of second electrodes (113-1, 113-2) are formed opposite to said plurality of luminous areas; a voltage applying unit (44) for applying a voltage between said first electrode and said second electrode; and an optical detector (33, 34, 35, 36, 43) for trapping said target polynucleotide through hybridization between said DNA probes fixed to said luminous areas and target polynucleotides (21) to which is coupled oligonucleotide (28) labeled with ECL and detecting ECL resulting from the application of said voltage.--

--22. A polynucleotide assay apparatus characterized in that it has a polynucleotide detecting cell provided with a first plate (11) whereon a first electrode (111) to which different DNA probes (13, 14, 15, 16) are fixed in a plurality of luminous areas (3, 4, 5, 6) differing with the type of DNA probe is formed and a second substrate which is arranged opposite to said first electrode and whereon a plurality of second electrodes (113-1, 113-2) are formed opposite to said plurality of luminous areas; a voltage applying unit (44) for applying a voltage between said first electrode and said second electrode; and an optical detector (33, 34, 35, 36, 43) for trapping said target polynucleotide through hybridization between said DNA probes fixed to said luminous areas and target polynucleotides (21) labeled with ECL and detecting ECL resulting from the application of said voltage.--

-- 23. A polynucleotide assay apparatus characterized in that it has a polynucleotide detecting cell provided with a first electrode (111) to which DNA probes (13, 14, 15, 16) are fixed in luminous areas (82-1 through 82-4) differing with the type of DNA probe and a plurality of second electrodes (83-1 through 83-4) arranged on the same plane as said first electrode, separated from said first electrode, each arranged in the central part of one or another of said luminous areas, and arranged at equal intervals in two directions; electrode selectors (91-1 through 91-4) for selecting an electrode out of said plurality of second electrodes; a voltage applying unit (44) for applying a voltage between said first electrode and said selected electrode; and an optical detector (43, 246) for detecting ECL generated from the ECL label by the application of said voltage, further having a device (45) for controlling the duration of the application of said voltage on the basis of the distance between the central part of said selected second electrode and the boundary of said luminous area adjoining said luminous area in which said selected second electrode is arranged and the velocity of the expansion of the region in which said ECL occurs; wherein said target polynucleotide trapped in each of said luminous areas is detected. --

-- 24. A polynucleotide assay apparatus characterized in that it has a polynucleotide detecting cell provided with a first electrode (111, 52, 60) to which DNA probes (13, 14, 15, 16) are fixed in luminous areas (3, 4, 5, 6, 61-1 through 61-6) differing with the type of DNA probe and a plurality of second electrodes (62-1 through 62-3) arranged on the same plane as said first electrode, separated from said first electrode, and arranged in one direction in parallel with part of said first electrode; electrode selectors (62-1S through 62-3S) for selecting an electrode out of said plurality of second electrodes; a voltage applying unit (44) for applying a voltage between said first electrode and said selected electrode; and an optical detector (72-1, 72-2) for detecting ECL generated from the ECL label by the application of said voltage; and a device (45) for controlling the duration of the application of said voltage on the basis of the velocity of the expansion of the region in which said ECL occurs; wherein said target polynucleotide trapped in each of said luminous areas is detected. --

-- 25. A polynucleotide assay apparatus characterized in that it has a polynucleotide detecting cell provided with a first plate (11) whereon a first electrode

(111) to which different DNA probes (13, 14, 15, 16) each having a phosphorothioate bond are fixed in a plurality of luminous areas (3, 4, 5, 6) differing with the type of DNA probe is formed and a second substrate which is arranged opposite to said first electrode and whereon a plurality of second electrodes (113-1, 113-2) are formed opposite to said plurality of luminous areas; a voltage applying unit (44) for applying a voltage between said first electrode and said second electrode; and an optical detector (33, 34, 35, 36, 43) for trapping said target polynucleotide through hybridization between said DNA probes fixed to said luminous areas and target polynucleotides (21), carrying out an extending reaction using a base (24) labeled with electrochemiluminescence (ECL) to extend said hybridized DNA probes, and thereby detecting ECL resulting from the application of said voltage; and the presence or absence of any extended chain (26) generated by said extending reaction is detected. --

-- 26. A polynucleotide assay apparatus characterized in that it has a polynucleotide detecting cell provided with a first plate (11) whereon a first electrode (111) to which different DNA probes (13, 14, 15, 16) each having a phosphorothioate bond are fixed in a plurality of luminous areas (3, 4, 5, 6) differing with the type of DNA probe is formed and a second substrate which is arranged

opposite to said first electrode and whereon a plurality of second electrodes (113-1, 113-2) are formed opposite to said plurality of luminous areas; a voltage applying unit (44) for applying a voltage between said first electrode and said second electrode; and an optical detector (33, 34, 35, 36, 43) for trapping said target polynucleotide through hybridization between said DNA probes fixed to said luminous areas and target polynucleotides (21) to which is coupled oligonucleotide (28) labeled with ECL and detecting ECL resulting from the application of said voltage. --

-- 27. A polynucleotide assay apparatus characterized in that it has a polynucleotide detecting cell provided with a first plate (11) whereon a first electrode (111) to which different DNA probes (13, 14, 15, 16) each having a phosphorothioate bond are fixed in a plurality of luminous areas (3, 4, 5, 6) differing with the type of DNA probe is formed and a second substrate which is arranged opposite to said first electrode and whereon a plurality of second electrodes (113-1, 113-2) are formed opposite to said plurality of luminous areas; a voltage applying unit (44) for applying a voltage between said first electrode and said second electrode; and an optical detector (33, 34, 35, 36, 43) for trapping said target polynucleotide through hybridization between said DNA probes fixed to said luminous areas and target polynucleotides (21) labeled with ECL and

detecting ECL resulting from the application of said voltage. --

--28. A polynucleotide assay apparatus characterized in that it has a polynucleotide detecting cell provided with a first electrode (111) to which DNA probes (13, 14, 15, 16) each having a phosphorothioate bond are fixed in luminous areas (82-1 through 82-4) differing with the type of DNA probe and a plurality of second electrodes (83-1 through 83-4) arranged on the same plane as said first electrode, separated from said first electrode, each arranged in the central part of one or another of said luminous areas, and arranged at equal intervals in two directions; electrode selectors (91-1 through 91-4) for selecting an electrode out of said plurality of second electrodes; a voltage applying unit (44) for applying a voltage between said first electrode and said selected electrode; and an optical detector (43, 246) for detecting ECL generated from the ECL label by the application of said voltage, further having a device (45) for controlling the duration of the application of said voltage on the basis of the distance between the central part of said selected second electrode and the boundary of said luminous area adjoining said luminous area in which said selected second electrode is arranged and the velocity of the expansion of the region in which said ECL occurs; wherein said target

polynucleotide trapped in each of said luminous areas is detected. --

-- 29. A polynucleotide assay apparatus characterized in that it has a polynucleotide detecting cell provided with a first electrode (111, 52, 60) to which DNA probes (13, 14, 15, 16) each having a phosphorothioate bond are fixed in luminous areas (3, 4, 5, 6, 61-1 through 61-6) differing with the type of DNA probe and a plurality of second electrodes (62-1 through 62-3) arranged on the same plane as said first electrode, separated from said first electrode, and arranged in one direction in parallel with part of said first electrode; electrode selectors (62-1S through 62-3S) for selecting an electrode out of said plurality of second electrodes; a voltage applying unit (44) for applying a voltage between said first electrode and said selected electrode; and an optical detector (72-1, 72-2) for detecting ECL generated from the ECL label by the application of said voltage; and a device (45) for controlling the duration of the application of said voltage on the basis of the velocity of the expansion of the region in which said ECL occurs; wherein said target polynucleotide trapped in each of said luminous areas is detected. --

REMARKS

Examination is requested.

Respectfully submitted,

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